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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,894	11/13/2001	Akira Yonemizu	215872US2	6142

22850 7590 08/11/2004

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EXAMINER
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MOORE, KARLA A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/986,894	<b>Applicant(s)</b> YONEMIZU ET AL.	
	<b>Examiner</b> Karla Moore	<b>Art Unit</b> 1763	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 May 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5,9-11,13,14 and 22-46 is/are pending in the application.
- 4a) Of the above claim(s) 22-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,9-11,13,14 and 39-43 is/are rejected.
- 7) ☒ Claim(s) 38 and 44-46 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

This application contains claims 22-37 drawn to an invention nonelected in a paper filed 11/18/02. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 38 recites the limitation "the supplier and the and the pressure reducing portion" and recites a limitation that relies on their presence, however they are not recited or described in claim 38 or claim 1 (the claim from which claim 38 depends). There is insufficient antecedent basis for this limitation in the claim. Claim 2 recites and describes "a supplier". Examiner has assumed that claim 38 was intended to depend from claim 2, and examined the amended application based on this assumption. Examiner has also assumed that "the pressure reducing portion" of claim 38 refers to the "first exhausting portion" and the "second exhausting portion" of claim 2, as there is not a "pressure reducing portion" recited. Clarification and/or correction are required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 9, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,235,634 to White et al. in view of U.S. Patent No. 6,403,924 to Hayashi.

6. White et al. disclose an apparatus substantially as claimed in Figure 7 disposed adjacent a main transfer mechanism (520,522) for processing a substrate, comprising: a heating process chamber (534) in which a heating process is performed for the substrate one by one; a load lock chamber (530), integrally connected to the heating process chamber in a predetermined direction, having an opening closable with a shutter (column 5, rows 42-43) allowing the substrate to be transferred between the main transfer mechanism and the load lock chamber, and transferring the substrate between the main transfer mechanism and the heating process chamber through the opening, controlling at least oxygen concentration and pressure (the chamber can be maintained at a vacuum level, which inherently controls both the oxygen concentration and the pressure); a transferring arm (column 8, rows 31-35) capable of moving between the heating process chamber and the load lock chamber and transferring the substrate one by one between the heating process chamber and the load lock chamber, and transferring the substrate between the main transfer mechanism and the heating chamber through the opening; and a gate valve (column 8, rows 31-35) shielding the heating process chamber from the load lock chamber. Examiner realizes that all features of the claimed invention recited above are not explicitly referenced in White et al., however, each of the elements is fairly suggested in alternative embodiments, which one of ordinary skill in the art are combinable to take advantage of key features of the invention.

8. White et al. disclose the invention substantially as claimed and as described above.

9. However, White et al. fail to teach the transferring arm having a temperature adjusting portion for adjusting a temperature of the substrate placed thereon.

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10. Hayashi teaches the use of a transfer arm with a temperature adjusting portion capable of cooling a substrate for the purpose of quickly cooling down a substrate (column 8, rows 40-50 and column 12, rows 1-2).

11. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a transfer arm with a temperature adjusting portion in White et al. in order to quickly cool down a substrate as taught by Hayashi.

12. With respect to claim 8, the load lock chamber of the apparatus further comprises: an opening through which the substrate is transferred to/from the outside, and a shutter allowing the opening to be opened and closed (column 5, rows 42-43).

13. With respect to claim 9, the transferring arm further comprises a waiting portion (column 8, rows 25-28) in the load lock chamber for temporarily placing the substrate prior to entry into the heating chamber. In the cited passage, the "heating chamber" refers to a "loadlock heating chamber" which is comparable to the "heating chamber " in the Figure 7 embodiment of the invention described above.

14. Claims 2, 3 and 39-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over White et al. and Hayashi as applied to claims 1, 8-9, 11 and 13 above, and further in view of U.S. Patent No. 5,286,296 to Sato et al and U.S. Patent No. 6,083,566 to Whitesell and U.S. Patent No. 6,331,212 to Mezey, Sr.

15. White et al. and Hayashi disclose the invention substantially as claimed and as described above.

16. However, White et al. and Hayashi fail to disclose a first exhausting portion for vacuum exhaustion, a second exhausting portion for normal exhaustion and a selecting portion adaptively selecting the first exhausting portion or the second exhausting portion and causing the selected portion to operate.

17. Sato et al. disclose a chamber comprising a first exhausting portion (12, turbo molecular pump) and a second vacuum exhaustion portion (13, booster pump) (column 4, rows 54-62; column 6, row 58 thru column 7, row 2; column 11, rows 10-15 ). The first and second exhausting portions connected to a chamber are provided for the purpose of reducing the chamber pressure to different vacuum levels; therefore, the chamber pressure can be set a desired value (abstract). The first and second exhausting

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portions are capable of reducing the inner pressure of a chamber to 1330 Pa or less (column 4, rows 57-59) and 100,000 Pa or less (column 5, rows 11-16), respectively.

18. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided first and second evacuation portions in White et al. and Hayashi in order to reduce the chamber to different vacuum levels, thus obtaining the desired chamber pressure as taught by Sato et al.

19. With respect to claim 39, Sato et al. specifically disclose an inert gas supplier and an exhausting portion for a load lock chamber for the purpose of preventing contaminants due to the ambient air, or degassing from the wafer or the load lock chamber into a processing chamber (column 2, row 63 through column 3, row 11).

20. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an inert gas supplier and an exhausting portion in the load lock chamber of White et al. and Hayashi et al. in order to prevent contamination of a processing chamber as taught by Sato et al.

21. White et al., Hayashi and Sato et al. disclose the invention substantially as claimed and as described above.

22. However, none of White et al., Hayashi and Sato et al. teach the use of a selecting portion for adaptively selecting a first exhausting portion or a second exhausting portion.

23. Whitesell teaches the use of first and second exhausting portions along with a controller for the purpose of controlling the two exhaust portions (column 4, rows 54-62; column 6, row 58 through column 7, row 2; and column 10, rows 50-55).

24. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a controller for the exhausting portions in White et al., Hayashi and Sato et al. in order to control the exhausting portions as needed as taught by Whitesell.

25. With respect to claims 2 and 3, White et al., Hayashi and Sato et al. and Whitesell disclose the invention substantially as claimed and as described above.

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26. However, White et al., Hayashi and Sato et al. and Whitesell fail to teach the heating process chamber comprising a supplier supplying an inert gas to the heating process chamber.

27. Mezey, Sr. discloses a heating process chamber with an inert gas supply (162) for the purpose of providing purge gas such as hydrogen or an inert gas to the heating process chamber (column 12, rows 40-43).

28. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an inert gas supply in a heating chamber in White et al., Hayashi and Sato et al. and Whitesell in order to provide an inert atmosphere in therein during a cooling cycle as taught by Mezey, Sr.

29. With respect to claims 40-43, White et al., Hayashi and Sato et al. and Whitesell disclose the invention substantially as claimed and as described above.

30. However, White et al., Hayashi and Sato et al. and Whitesell fail to teach the heating process chamber comprising upper, lower and side wall portions with independent temperature control mechanisms, comprising both heating and cooling.

31. Mezey, Sr. discloses a heating process chamber with a zoned independent temperature control system for the purpose of controlling the temperature of a process gas before and after it reaches the wafer (column 3, rows 20-26 and 42-47). The apparatus further comprises cooling conduits/pipes (column 5, rows 1-6) for the purpose of removing heat from the walls.

32. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a zoned independent temperature control system in a heating chamber in White et al., Hayashi and Sato et al. and Whitesell in order to control the temperature of a process gas before and after it reaches the wafer enabling a system capable simple operation and maintenance and improved results as taught by Mezey, Sr.

33. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over White et al. and Hayashi as applied to claims 1, 8-9, 11 and 13 above, and further in view of U.S. Patent No. 4,389,970 to Edgerton.

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34. White et al. and Hayashi disclose the invention substantially as claimed and as described above.

35. However, White et al. and Hayashi fail to disclose a controller for controlling the temperature of the heating process for the substrate in the heating process chamber. The controller capable of controlling the temperature in the range from 100 degrees C to 800 degrees C.

36. Edgerton teach the use of heating means and a detector for the purpose of controlling circuitry for continuously adjusting the intensity of the heating means to regulate substrate temperature (abstract). The controller is capable of controlling the temperature in the range of 100 degrees C and 800 degrees C (column 7, rows 7-11).

37. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a controller in White et al. and Hayashi in order to regulate substrate temperature as taught by Edgerton.

38. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over White et al. and Hayashi as applied to claims 1, 8-9, 11 and 13 above, and further in view of U.S. Patent No. 6,079,928 to Theriault et al.

39. White et al. and Hayashi disclose the invention substantially as claimed and as described above.

40. However, White et al. and Hayashi fail to disclose a supplier supplying an inert gas to the heating process chamber.

41. Theriault et al. teach supplying an inert gas to a heating chamber for the purpose of filling a chamber with an inert gas to obtain active heating so as to supplement radiant heat within the chamber (column 6, rows 65 through column 7, row 1).

42. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an inert gas supply in the heating chamber in White et al. and Hayashi in order to fill a chamber with an inert gas to obtain active heating so as to supplement radiant heat within the chamber as taught by Theriault et al.



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43. Claims 10 and 14 are rejected under 35U.S.C. 103(a) as being unpatentable over White et al. and Hayashi as applied to claims 1, 8-9, 11 and 13 above, and further in view of U.S. Patent No. 5,735,961 to Shimada.

44. White et al. and Hayashi disclose the invention substantially as claimed and as described above.

45. However, White et al. and Hayashi fail to teach a supplier supplying an active gas to the load lock chamber and a sprayer spraying the active gas to a front surface of the substrate in the load lock chamber so as to reform the front surface of the substrate.

46. Shimada teaches the use of an oxygen (active gas) supply pipe (Figure 1, 19; supplier) in communication with a gas supply pipe (11; sprayer) supplying oxygen to the load lock chamber connected to a heat process chamber for the purpose of generating a native oxide layer on wafers while loaded in the load lock chamber (column 4, rows 50-64 and column 5, rows 50-54).

47. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a supplier and sprayer in the load lock chamber in White et al. and Hayashi in order to generate a native oxide layer in wafer while loaded in the load lock chamber as taught by Shimada.

#### ***Allowable Subject Matter***

46. Claim 38 and 44-46 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

47. The following is a statement of reasons for the indication of allowable subject matter in claim 38: The prior art of record fails to teach or fairly suggest **a controller controlling the supplier and a pressure reducing portion** (the first and second exhausting portions) as claimed. Further, no other properly combinable reference was located to supply the teaching.

48. The following is a statement of reasons for the indication of allowable subject matter in claims 44 and 45: The prior art of record fails to teach or fairly suggest the heating chamber further comprising: **a canopy member disposed opposite to the gate valve of the load lock chamber and provided integrally with a lid member so that the canopy member is placed in a upper portion of the gate**

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**valve when the lid member is lifted up, and placed in a lower portion of the gate valve when the lid member is lowered down** as claimed. Further, no other properly combinable reference was located to supply the teaching.

### ***Response to Arguments***

49. Applicant's arguments filed 5/19/04 have been fully considered but they are not persuasive. Applicant argues that the shuttles/robots of White are distinguishable from those of the claimed invention. Examiner points out that the shuttles/robots pointed out in the remarks are not the transport mechanism relied upon in the rejections, which is described at column 8, rows 31-37. Examiner also notes that the recitations added to claims 1 and 11 regarding collection of the substrate are intended use recitations that the mechanism of White would be capable of as it is just a reverse of the loading movement. One of ordinary skill in the art would recognize that a substrate could be removed by reversing the loading movement.

### ***Conclusion***

50. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

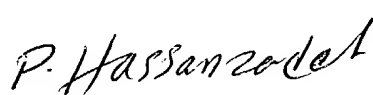
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571.272.1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



km  
9 August 2004



Parviz Hassanzadeh  
Primary Examiner  
Art Unit 1763